

Forestry and *Banksia* woodlands on the Swan Coastal Plain

E R Hopkins

Department of Conservation and Land Management,
Hackett Drive, Crawley WA 6009

Introduction

From earliest settlement days the forests and woodlands of the Swan Coastal Plain were heavily exploited for their wood resources. The target species was jarrah used for fuel and pit sawn and later milled for heavy structural timber. Tuart was revered for its structural qualities and since early days has been managed for special timbers for flooring and waggon construction. Tuart management and preservation was a major concern of early forest management and State forests 1 and 2 were established for this purpose. *Banksia* was used as firewood but was of secondary interest.

Early Management

Apart from tuart management the first organized forestry attention saw the Coastal Plain as an opportunity to grow pines and reduce the heavy costs to the Colony of importing softwoods. For this purpose the Spearwood and Bassendean Dune systems offered the following advantages:

- 1 The apparently otherwise "worthless nature" of much of the woodlands for alternative economic purposes (ie for agriculture, urbanization).
- 2 The close proximity to the main centres of development (wood markets).
- 3 Relatively gentle topography and cheap clearing costs for plantation establishment.
- 4 The example of afforestation with *Pinus pinaster* in a climate and on sands considered to be similar in the Gascony region of France during the period 1781 to 1864.

The first initiative to convert areas of the Swan Coastal Plain woodlands to pine is recorded in an annual report submitted in 1987 by Ednie-Brown, Conservator of Forests. He noted that an endeavour should be made to favour plantations of some of the softwoods of commerce and thus make the Colony independent of outside supplies. Trial plantings were made that year on coastal sand dunes near Bunbury. They failed. Other sites were tried and early reports on the growth of pines at Hamel and Ludlow were enthusiastic. *Pinus radiata* was favoured because of its great success in South Australia. The early promise with coastal pine planting was not maintained and in 1916 most of the failed *P. radiata* was felled and replaced by *P. pinaster*.

In 1916, Sir David Hutchins, a prominent British forester employed to report on the forestry situation in Western Australia observed that "one problem was to fill up the sparse stocking of

the jarrah forest with the stocking of timber that the climate fits it to carry and so improve the yield and straighten up the too often crooked jarrah" (Hutchins 1916). He noted that pines naturally suggest themselves and favoured *P. pinaster* of the Portuguese provenance for the coastal sands.

Plantation Development

Three centres of interest were concentrated on for pine planting on the coastal sands—Ludlow, Myalup and Gnangara. Ludlow operations were largely in conjunction with managing the tuart reserve. The few stands that remain are the best and were concentrated on the Tuart sands of the Spearwood Dunes types. Most of the Ludlow plantings were, however, on the poorer non-tuart sites on the Coolilup sands. These had a high banksia component in the original flora and have now been largely removed in a mineral sands operation.

The Gnangara area was first considered as a pine planting proposition by C E Lane Poole in 1917. He was greatly influenced by the similarity of the sandy areas available to those of the Landes in Gascony. Some 3 100 ha were subdivided into compartments and a railway was surveyed from Bayswater to market the logs and firewood removed in clearing the sites. A number of trial plots were cleared and planted with *P. pinaster* raised in nurseries or direct sown.

Plantings at Myalup and Gnangara concentrated on sands of the Spearwood (Myalup) and Bassendean Dunes types. Problems with nutrition, establishment, genetics and spacing (Kessell 1927; Kessell & Stoate 1938, Perry 1939, Stoate 1939, 1946, Hopkins 1960a, b Perry & Hopkins 1967, Havel 1968, Butcher & Havel 1976; Butcher 1977a, b) needed to be overcome.

Up to 1988 c 28 000 ha of pine plantation had been established on sands of the Swan Coastal Plain. Of this area c 10 500 ha and 5 730 ha are on grey and transitional sands of the Bassendean System and 11 000 ha are on yellow sands of the Spearwood System.

Extension has now ceased due largely to the changing values placed on the land types by a developing urban population.

Current Plantation Values

Ludlow is now managed completely for conservation values of the native forests. Ludlow plantations will only remain until they can be converted to best suit the new national park role of the area.

Myalup-McLarty plantations have provided a small but strategic source of pines which can be logged in winter when logging is difficult in the major *P.radiata* plantations of the Blackwood Valley. It is probable much of the *P.pinaster* will be converted to *P.radiata* to provide a valuable economic resource.

For Gngangara, Pinjar and Yanchep the prime value of the area is now recognized as water production from the Gngangara mound (Butcher 1979a, b). A fibre board plant is projected for 1989 to provide for commercial thinning of the plantations and from approximately 1990, the saw log yield will increase to support a significant milling industry. Whether these northern pines will be replanted for a second rotation to favour water management and wood production is yet to be determined.

Recreation in these coastal plantations is an increasing benefit to population development.

Impact on *Banksia* Woodland

Havel (1968) has described the site types considered for pine planting in State forest 65 on the northern Swan Coastal Plain. On the Bassendean Sands and Transition Areas the *Banksia* dominated woodlands have proved unsuitable for commercial pine planting due to both low fertility and poor water relations. Generally only the sites carrying jarrah and marri have been suitable.

On Spearwood Dunes, favourable sites containing tuart and or jarrah cease north of Yanchep and most areas planted are on *banksia* woodland types with deep yellow sands. In the absence of moisture associated species such as jarrah, tuart, *B.grandis* and *B.ilicifolia*, pine planting is of questionable value without supporting heavy thinning costs.

Unplanted areas of the original forestry reserves are now managed as portion of the major conservation reserves to remain on the Swan Coastal Plain. Apart from the plantation areas, conservation is now the highest value to be managed for. This is a challenging requirement as the increasing population, adjacent urbanization and high value for recreation renders management of fire and public access a major problem.

Of 60 573 ha of State forest north of Perth, 23 050 ha have been converted to pine, 10 000 ha have been singled out for conservation reserves and some 27 500 ha of *Banksia* woodland remain for general conservation and recreation purposes. For the 9 000 ha of State forest on the Swan Coastal Plain south of Perth, 4 000 ha have been cleared for pine plantation, 1 400 ha have been selected for conservation reserves and 3 600 ha are managed for general conservation and protection purposes.

References

- Butcher T B 1977a Gains from the *Pinus pinaster* Ait. improvement programme in Western Australia. In: Proceedings, Third World Consultation on Forest Tree Breeding, Canberra.
- Butcher T B 1977b Impact of moisture relationships on the management of *Pinus pinaster* Ait. plantations in Western Australia. For Ecol Manage 1:97-107.
- Butcher T B 1979a Management of *Pinus pinaster* plantations on the Swan Coastal Plain for timber and water yield. Aust Water Res Council Tech Paper 42.
- Butcher T B 1979b Growing sawlogs on the Gngangara Mound. Hydrology and Water Resources Sympo, Perth, 97-98.
- Havel J J 1968 The potential of the northern Swan Coastal Plain for *Pinus pinaster* Ait. plantations. W Aust Forests Dept Bull 76.
- Hopkins E R 1960a The fertilizer factor in *Pinus pinaster* Ait. plantations on sandy soils of the Swan Coastal Plain, Western Australia. W Aust Forests Dept Bull 68.
- Hopkins E R 1960b Variation in the growth rate and quality of *Pinus pinaster* Ait. in Western Australia. W Aust Forests Dept Bull 67.
- Hutchins D E 1916 A discussion of Australian forestry with special references to forestry in Western Australia. W Aust Forests Dept Bull 5.
- Kessell S L 1927 Soil Organisms. The dependence of certain pine species on a biological soil factor. Empire For J 6:70-74.
- Kessell S L & Stoate T N 1938 Pine Nutrition. An account of investigations and experiments in connection with the growth of exotic conifers in Western Australia plantations. W Aust Forests Dept Bull 50.
- Perry D H 1939 The effect of superphosphate on *Pinus pinaster*. Aust For 4:12-14.
- Perry D H & Hopkins E R 1967 Importation of breeding material of *Pinus pinaster* Ait. from Portugal. W Aust Forests Dept Bull 75.
- Stoate T N 1939 Pine establishment. W Aust Forests Dept Bull 53.
- Stoate T N 1946 Pine establishment. W Aust Forests Dept Bull 53A.